

## Talking Wheelchair

The disabled young man pictured is unable to speak, but he is communicating by means of an electronic system which produces highly intelligible synthesized speech. Known familiarly as the "talking wheelchair" and formally as the Versatile Portable Speech Prosthesis (VPSP), the system incorporates technology developed by Ames Research Center for advanced aircraft communications. The VPSP was developed by Stanford University Medical Center, Stanford, California and Psycho-Linguistic Research Associates, Menlo Park, California with NASA-Ames funding assistance. Other participants include personnel of Ames Research Center, the NASA Biomedical Application Team at Stanford, and Children's Hospital at Stanford.

The wheelchair-mounted system consists of a word processor, a video screen, a voice synthesizer and a computer program which instructs the synthesizer how to produce intelligible sounds in response to user commands. To save time, the computer's memory contains 925 words plus a number of common phrases and questions from which users can construct messages; the memory can also store several thousand other words of the user's choice. Any word not already in the memory can be entered, one letter at a time, and the VPSP will pronounce it. Depending on the user's disability, message units are selected by operating a simple switch, a joystick or a keyboard. The completed message appears on the video screen; then the user activates the speech synthesizer, which generates a voice with a somewhat mechanical tone. Continuing research aims at development of a more natural tone. With the keyboard, an experienced user can construct messages as rapidly as 30 words per minute.

The NASA technology used in the VPSP was developed as an aid to pilots who experience critical aircraft malfunctions. To free the pilot from the necessity for watching several instruments during the emergency, Ames Research Center developed experimental systems to provide synthesized voice readout of aircraft altitude, airspeed, descent rate and deviation from flight path. VPSP co-developer Dr. Carol Simpson, formerly a NASA researcher and now with Psycho-Linguistic Research Associates, applied this technology to the talking wheelchair.

The VPSP offers potential for people—some 1,500,000 in the United States alone—who have lost speech function as a result of such afflictions as stroke, cerebral palsy, muscular dystrophy, Parkinson's disease or multiple sclerosis. A company—Computers for the Physically Handicapped, Huntington Beach, California—has expressed interest in commercial production of the VPSP system and negotiations are under way.

